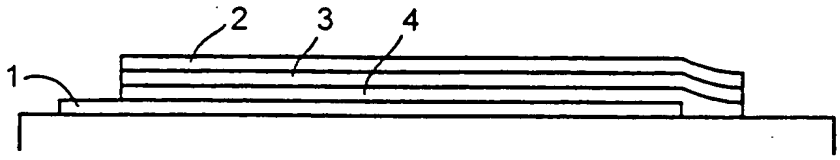
FIG. 1a

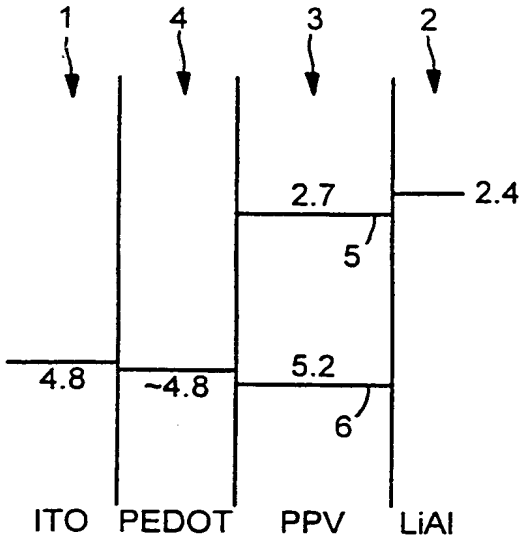


FIG. 1b

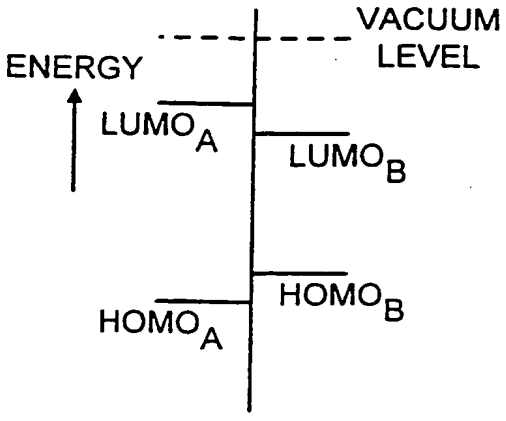


FIG. 2a

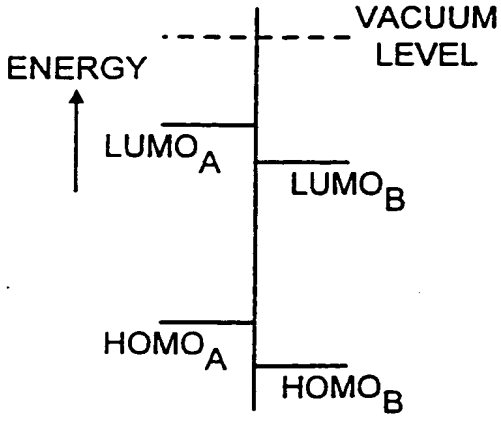
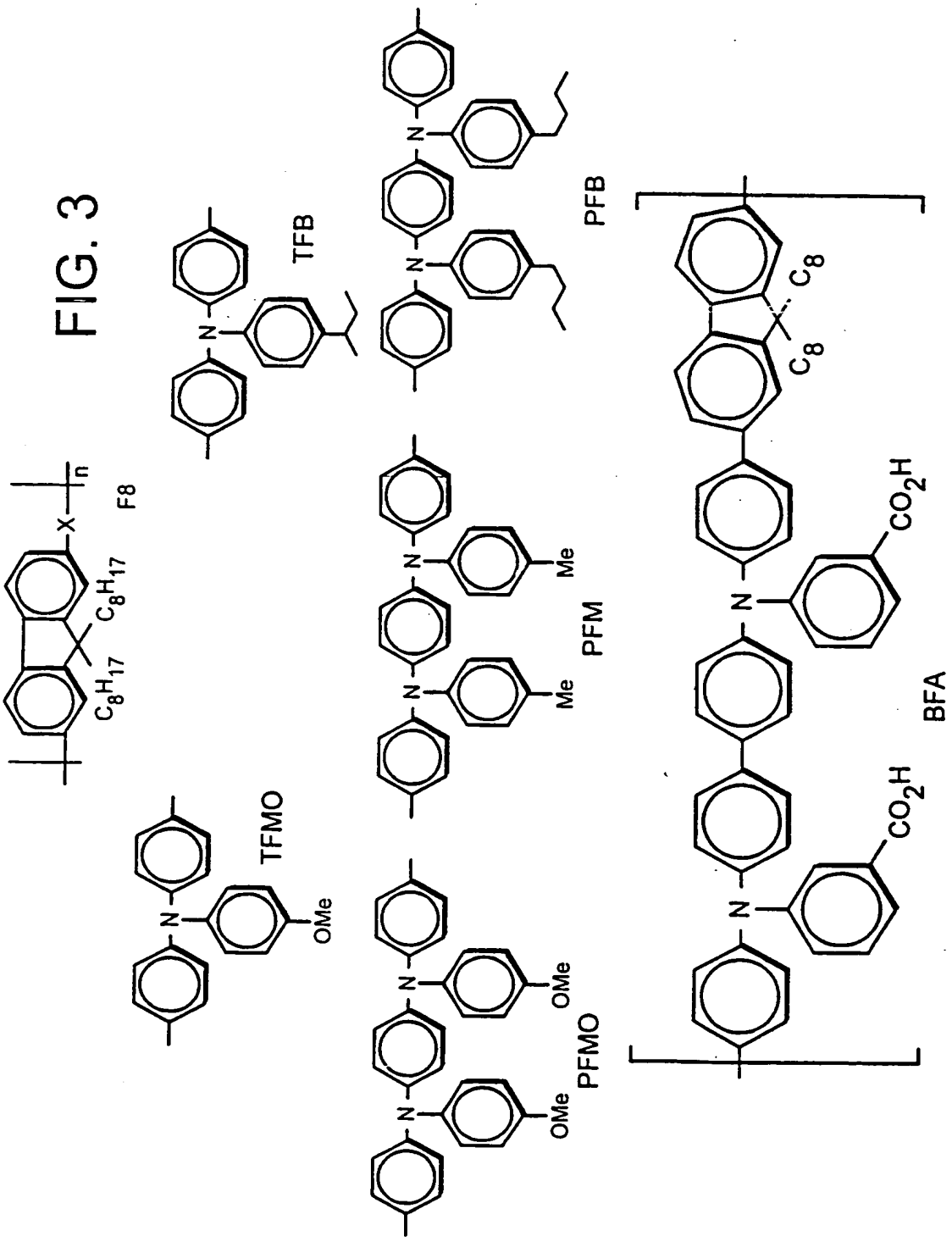


FIG. 2b

FIG. 3


F8
TFB
PFB
PFM
TFMO
PFMO
BFA
C_8H_{17}
C_8H_{17}
C_8
C_8
CO_2H
CO_2H
Me
Me
OMe
OMe
OMe
N
X
n

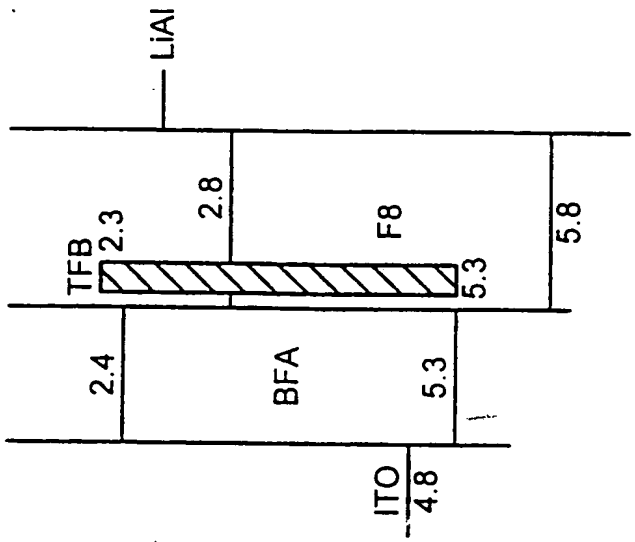


FIG. 9

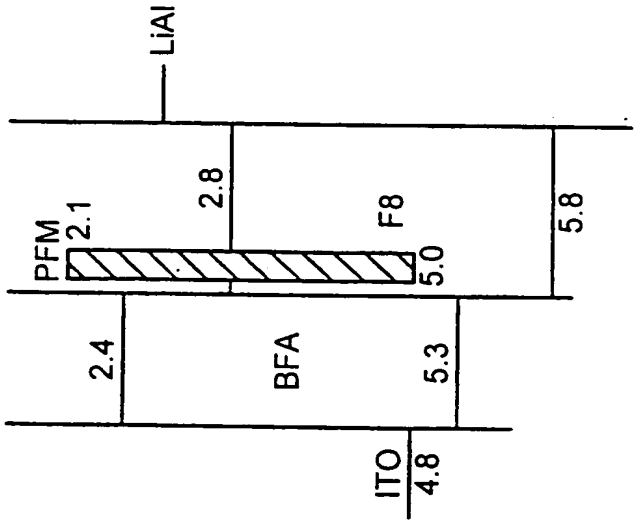


FIG. 6

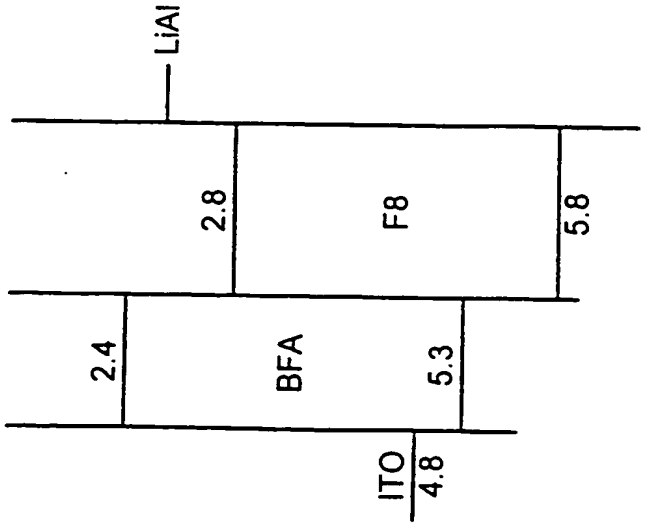


FIG. 4

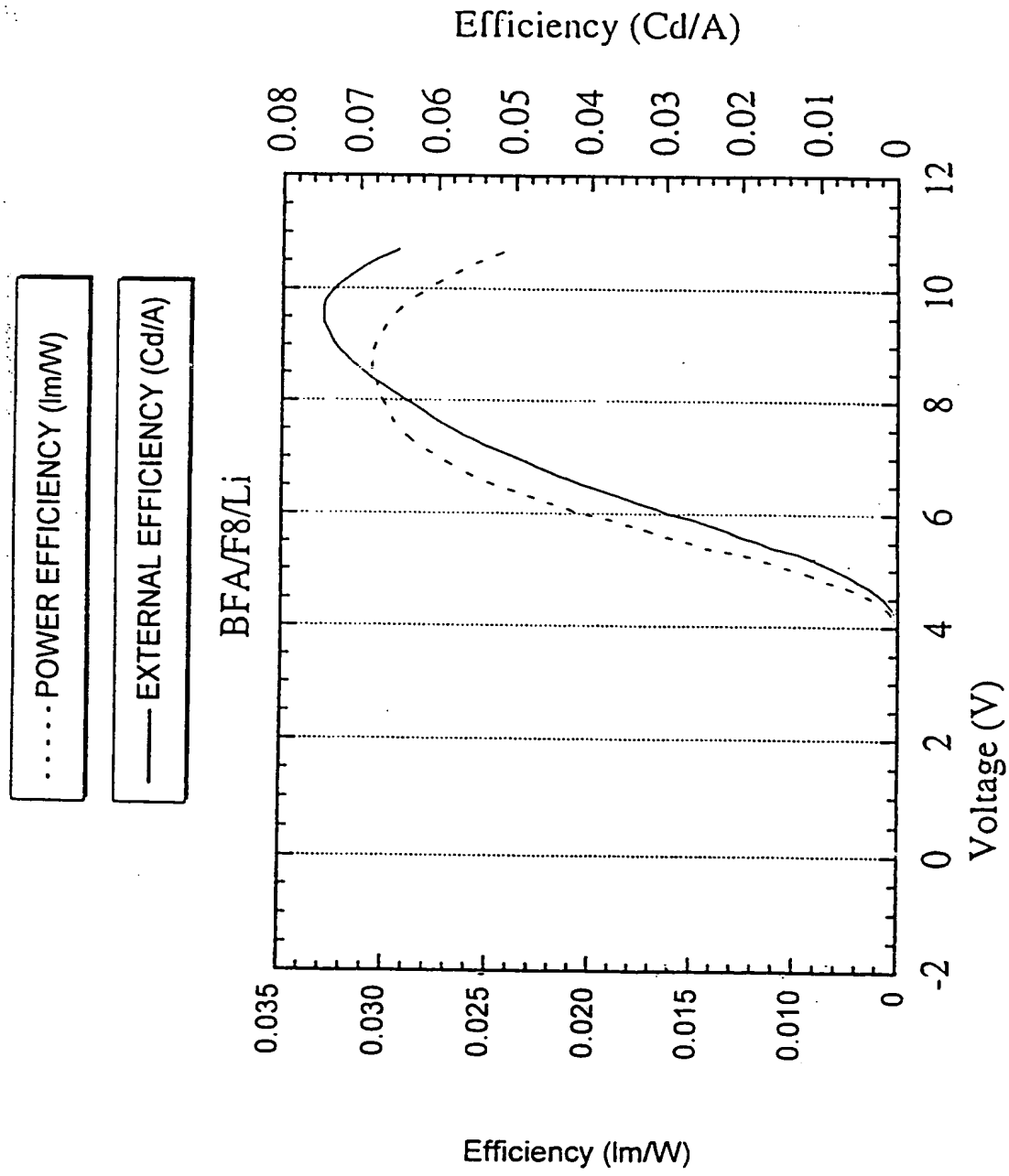

Efficiency (Cd/A)
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
12
10
8
6
4
2
0
-2
Voltage (V)
0.035
0.030
0.025
0.020
0.015
0.010
0
Efficiency (lm/W)
BFA/F8/Li
POWER EFFICIENCY (lm/W)
EXTERNAL EFFICIENCY (Cd/A)

FIG. 5

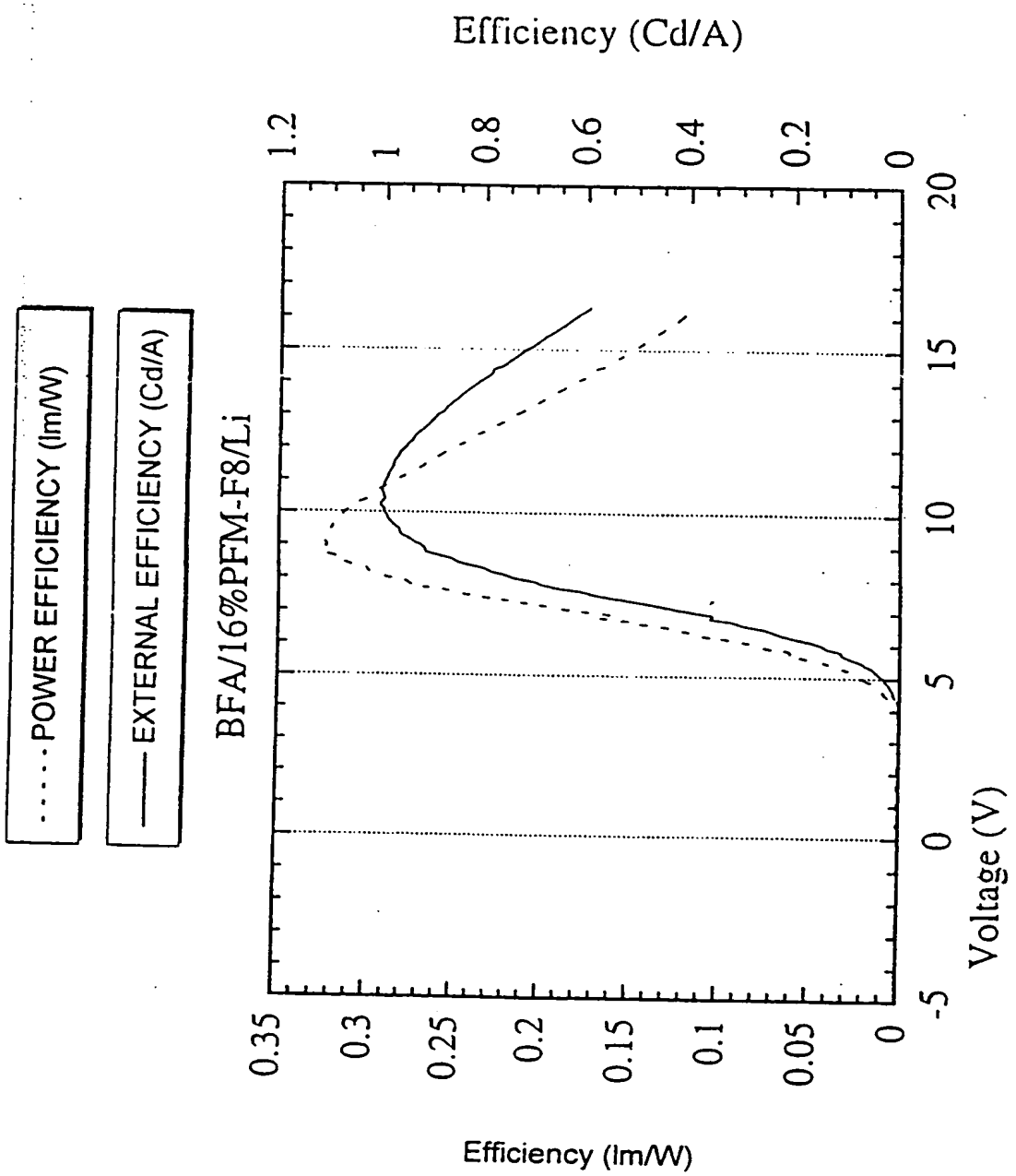

Efficiency (Cd/A)
1.2
1
0.8
0.6
0.4
0.2
0
20
15
10
5
0
-5
Voltage (V)
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
Efficiency (lm/W)
BFA/16%PFM-F8/Li
POWER EFFICIENCY (lm/W)
EXTERNAL EFFICIENCY (Cd/A)

FIG. 7

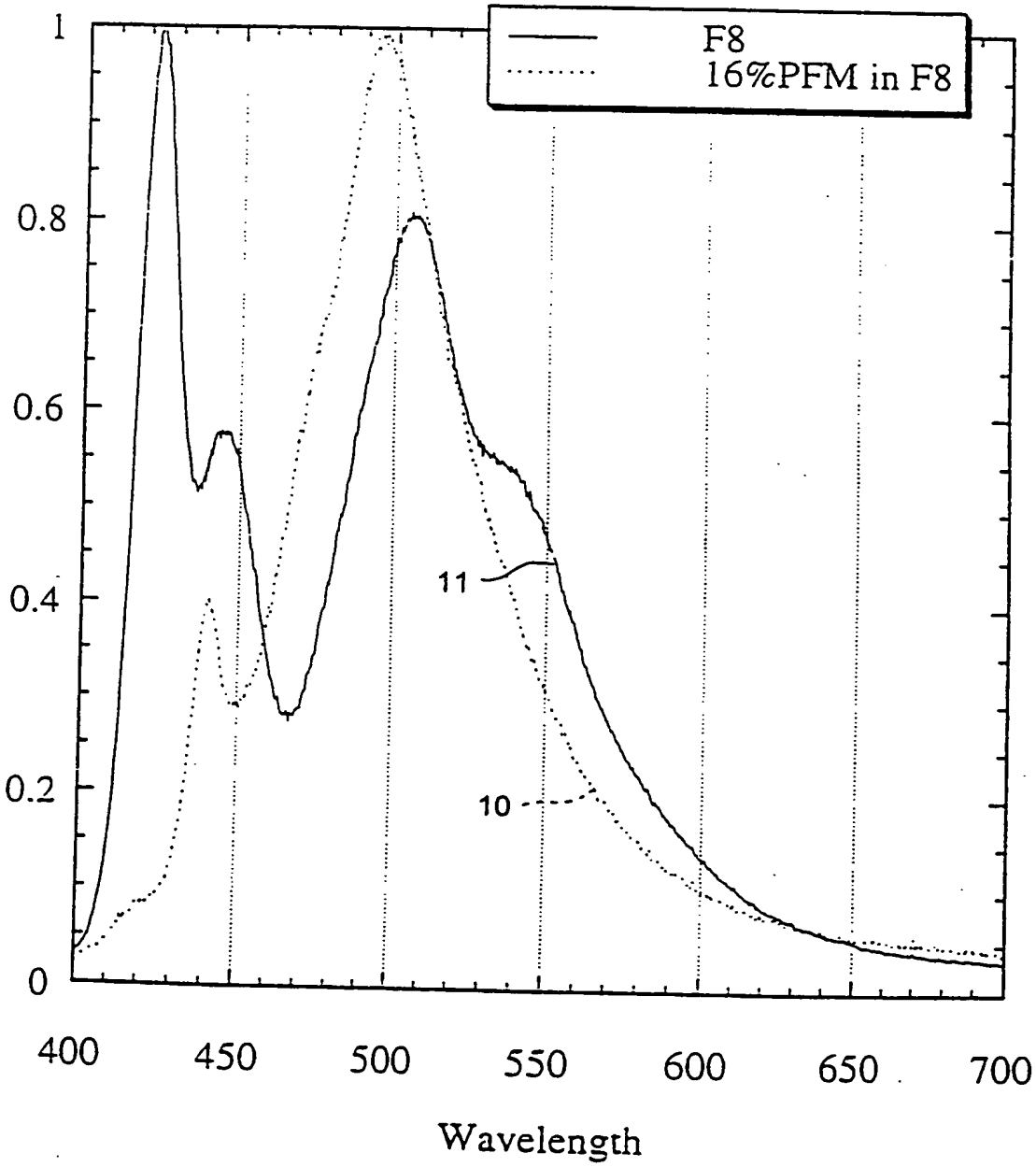

F8
16%PFM in F8
1
0.8
0.6
0.4
0.2
0
11
10
400
450
500
550
600
650
700
Wavelength

FIG. 8

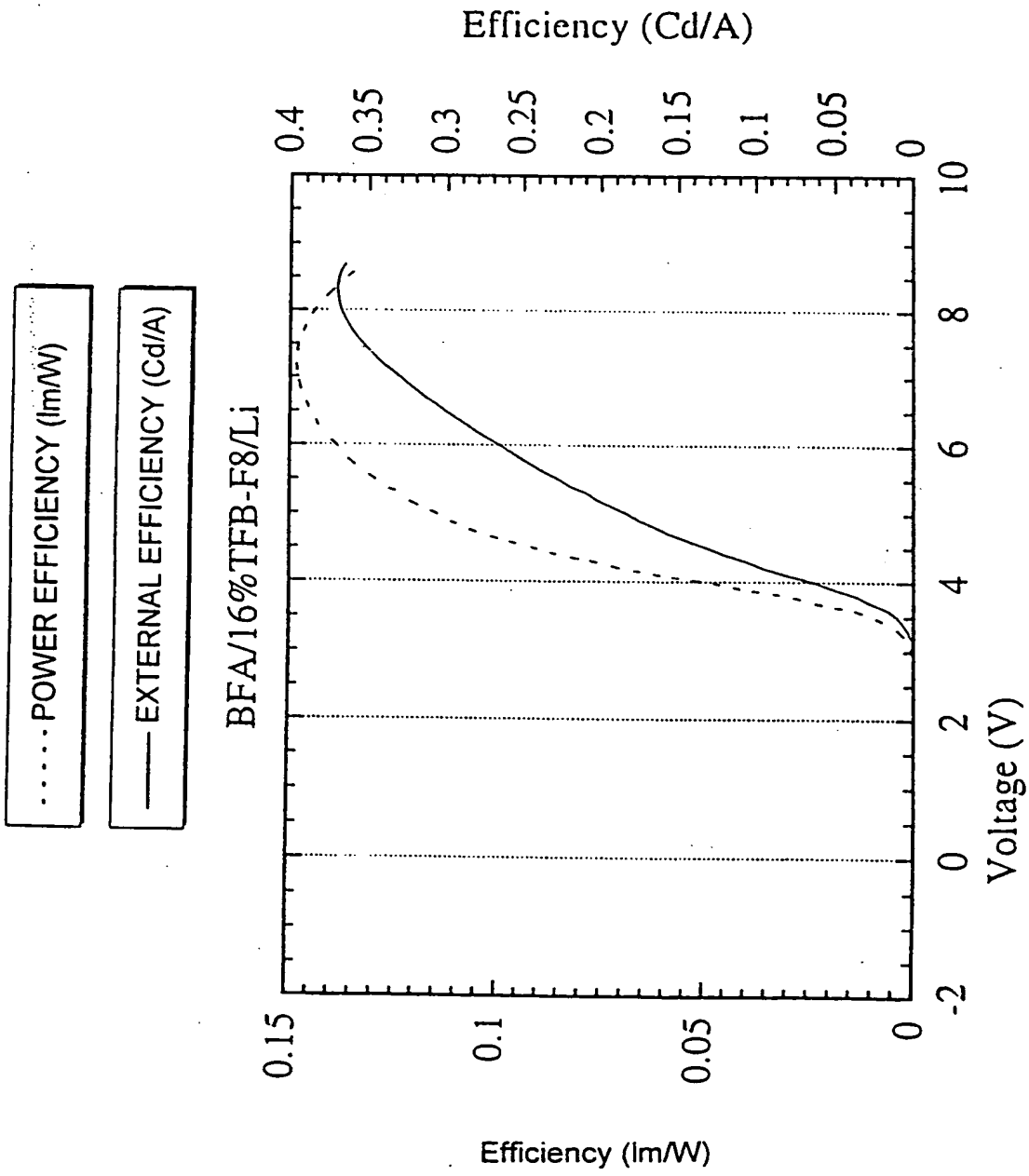

Efficiency (Cd/A)
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
10
8
6
4
2
0
-2
Voltage (V)
BFA/16%TFB-F8/Li
POWER EFFICIENCY (lm/W)
EXTERNAL EFFICIENCY (Cd/A)
0.15
0.1
0.05
0
Efficiency (lm/W)

FIG. 10

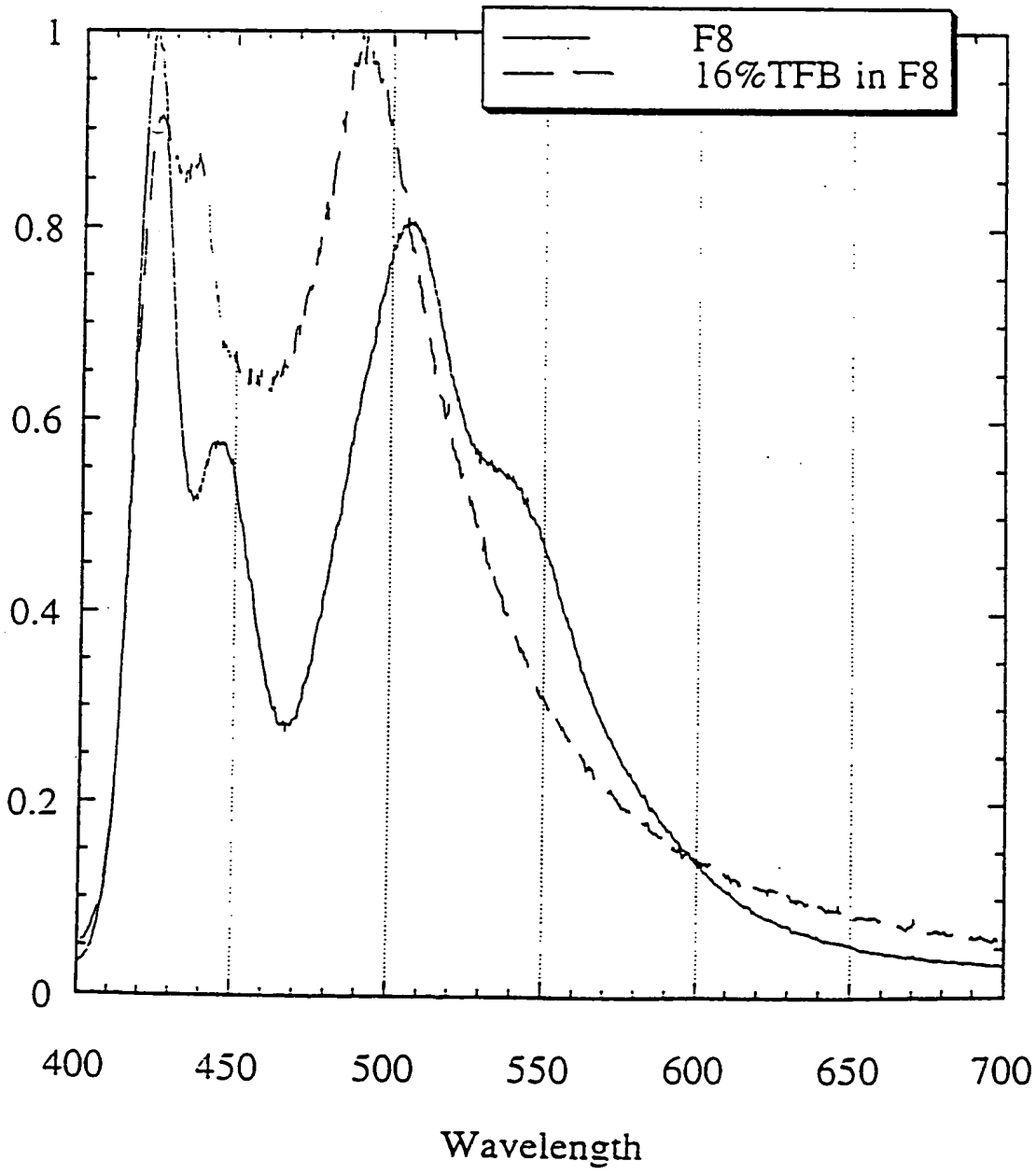

F8
16%TFB in F8
1
0.8
0.6
0.4
0.2
0
400
450
500
550
600
650
700
Wavelength

FIG. 11

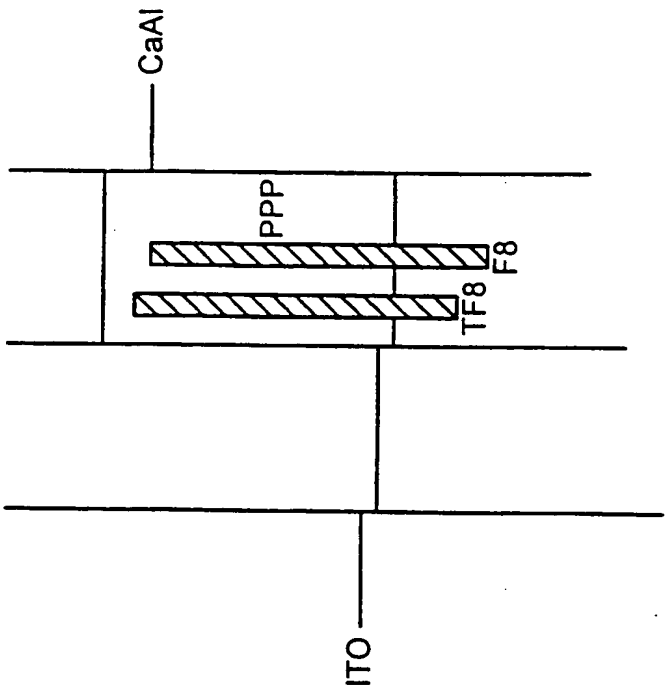

CaAl
PPP
F8
TF8
ITO

FIG. 21

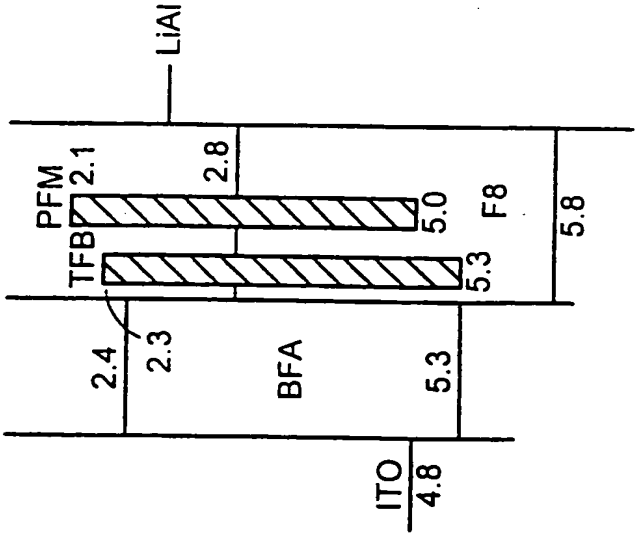

LiAl
PFM
2.1
2.8
5.0
F8
5.8
TFB
5.3
2.4
2.3
BFA
5.3
ITO
4.8

FIG. 12

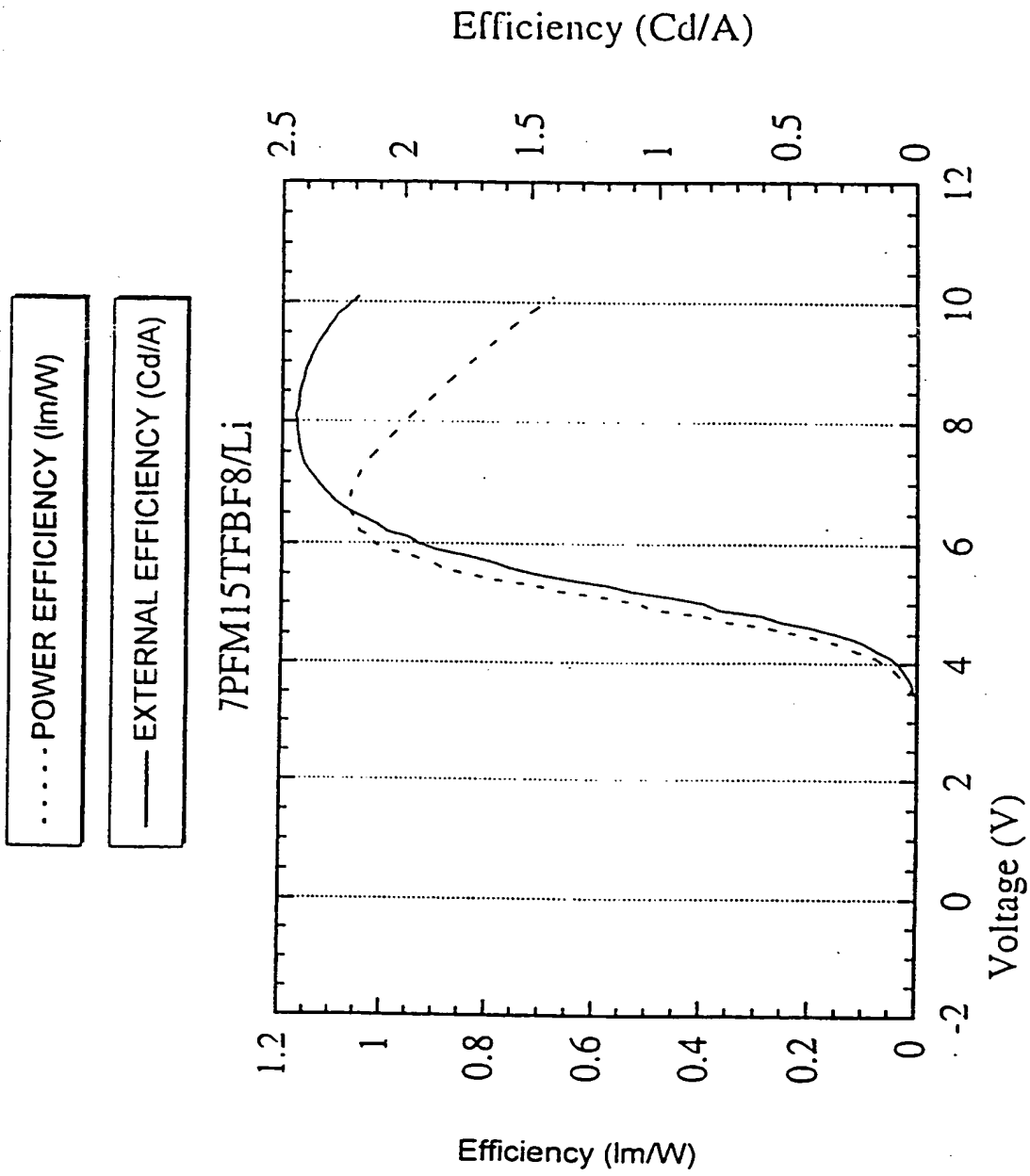

Efficiency (Cd/A)
2.5
2
1.5
1
0.5
0
12
10
8
6
4
2
0
-2
Voltage (V)
1.2
1
0.8
0.6
0.4
0.2
0
Efficiency (lm/W)
7PFM15TFBF8/Li
POWER EFFICIENCY (lm/W)
EXTERNAL EFFICIENCY (Cd/A)

FIG. 13

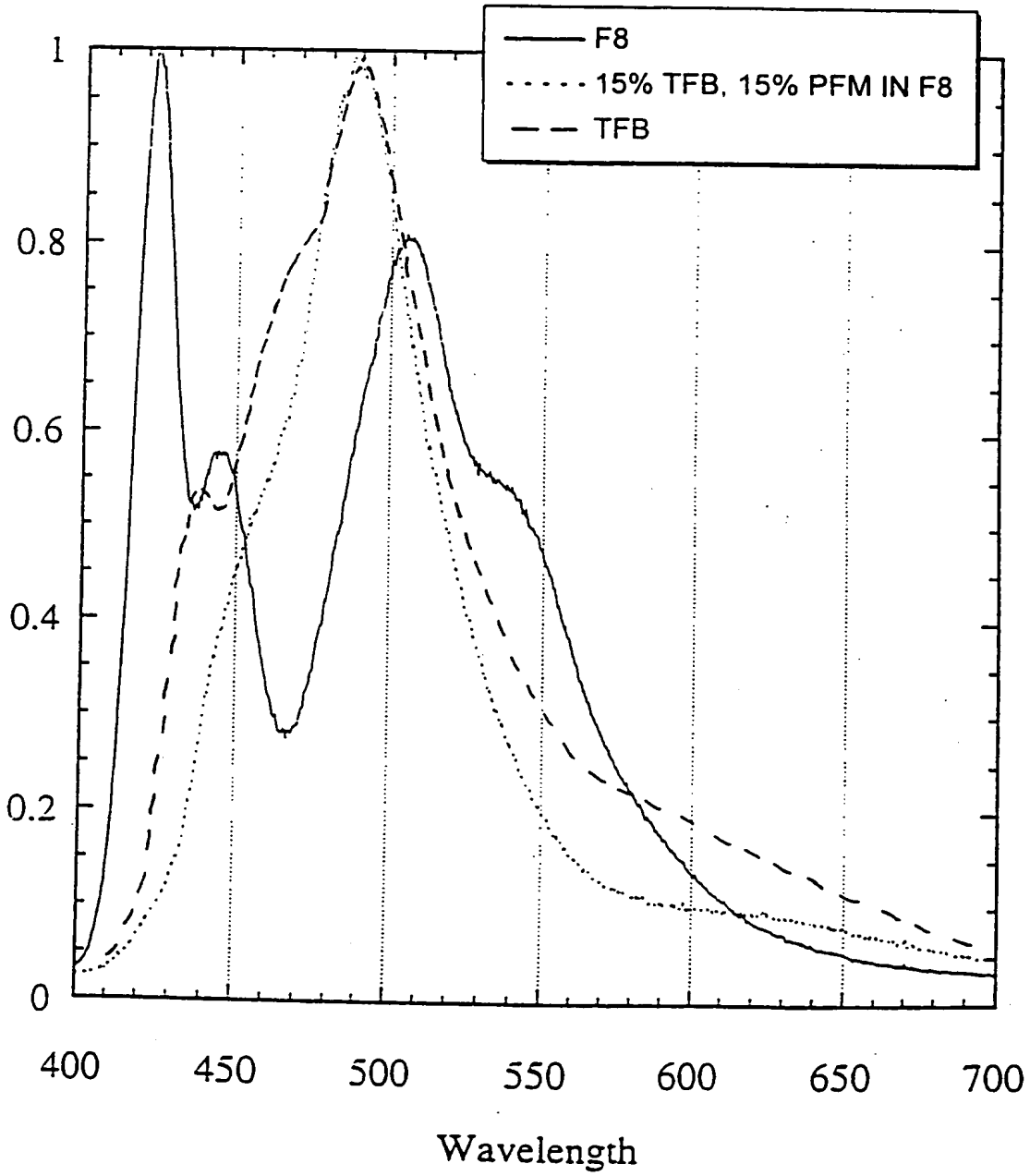

F8
15% TFB, 15% PFM IN F8
TFB
1
0.8
0.6
0.4
0.2
0
400
450
500
550
600
650
700
Wavelength

FIG. 14

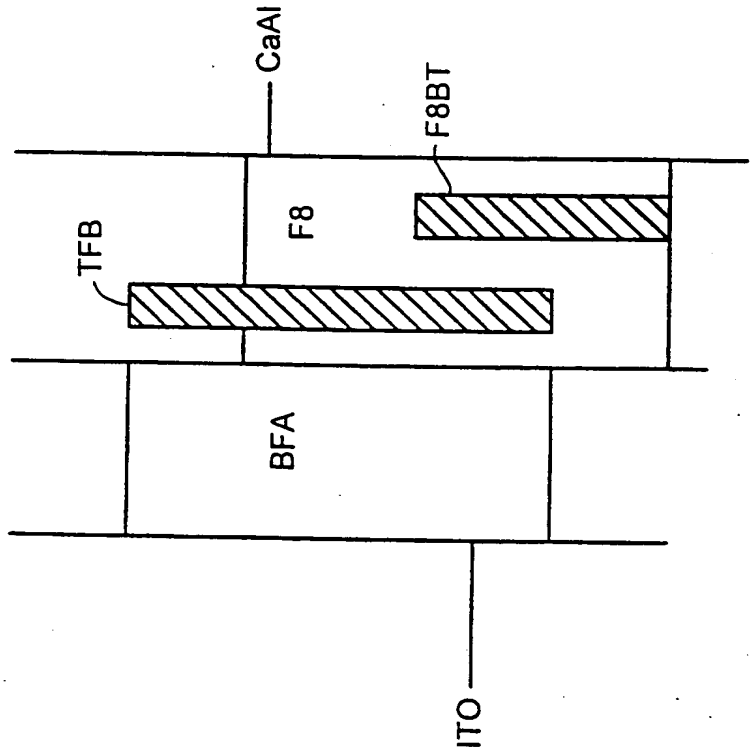


FIG. 18

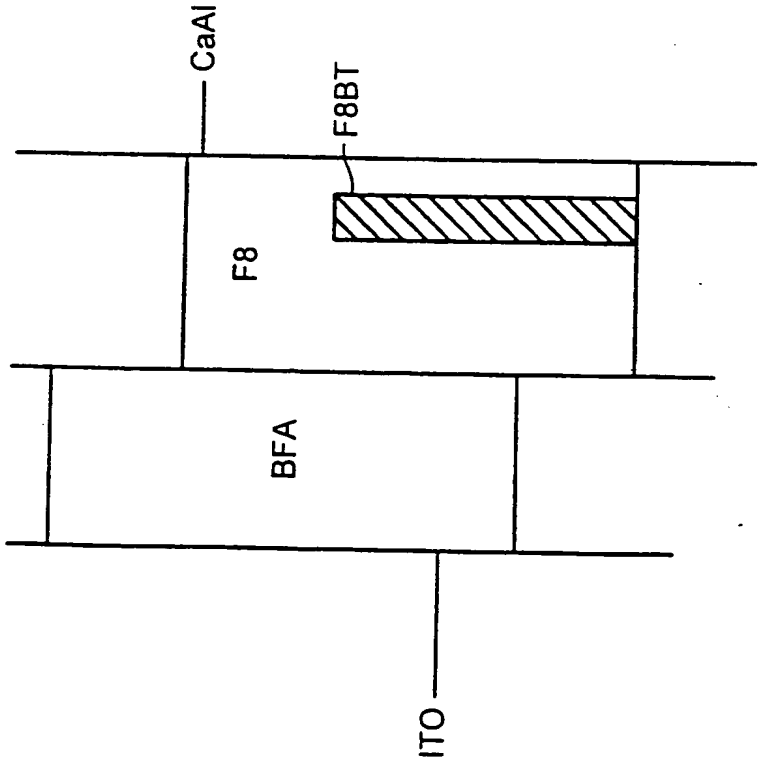


FIG. 15

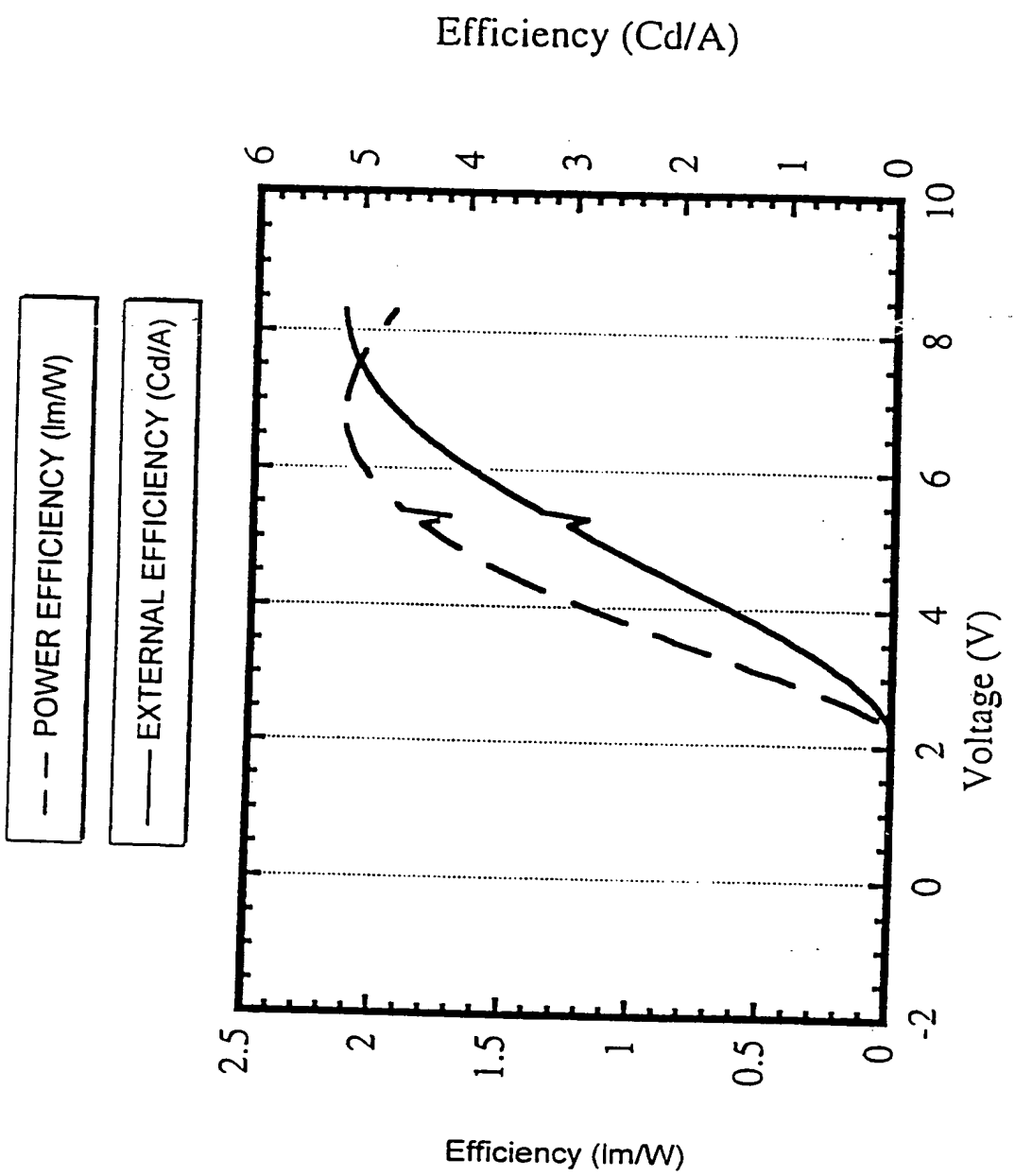

Efficiency (Cd/A)
6
5
4
3
2
1
0
10
8
6
4
2
0
-2
Voltage (V)
POWER EFFICIENCY (lm/W)
EXTERNAL EFFICIENCY (Cd/A)
2.5
2
1.5
1
0.5
0
Efficiency (lm/W)

FIG. 16

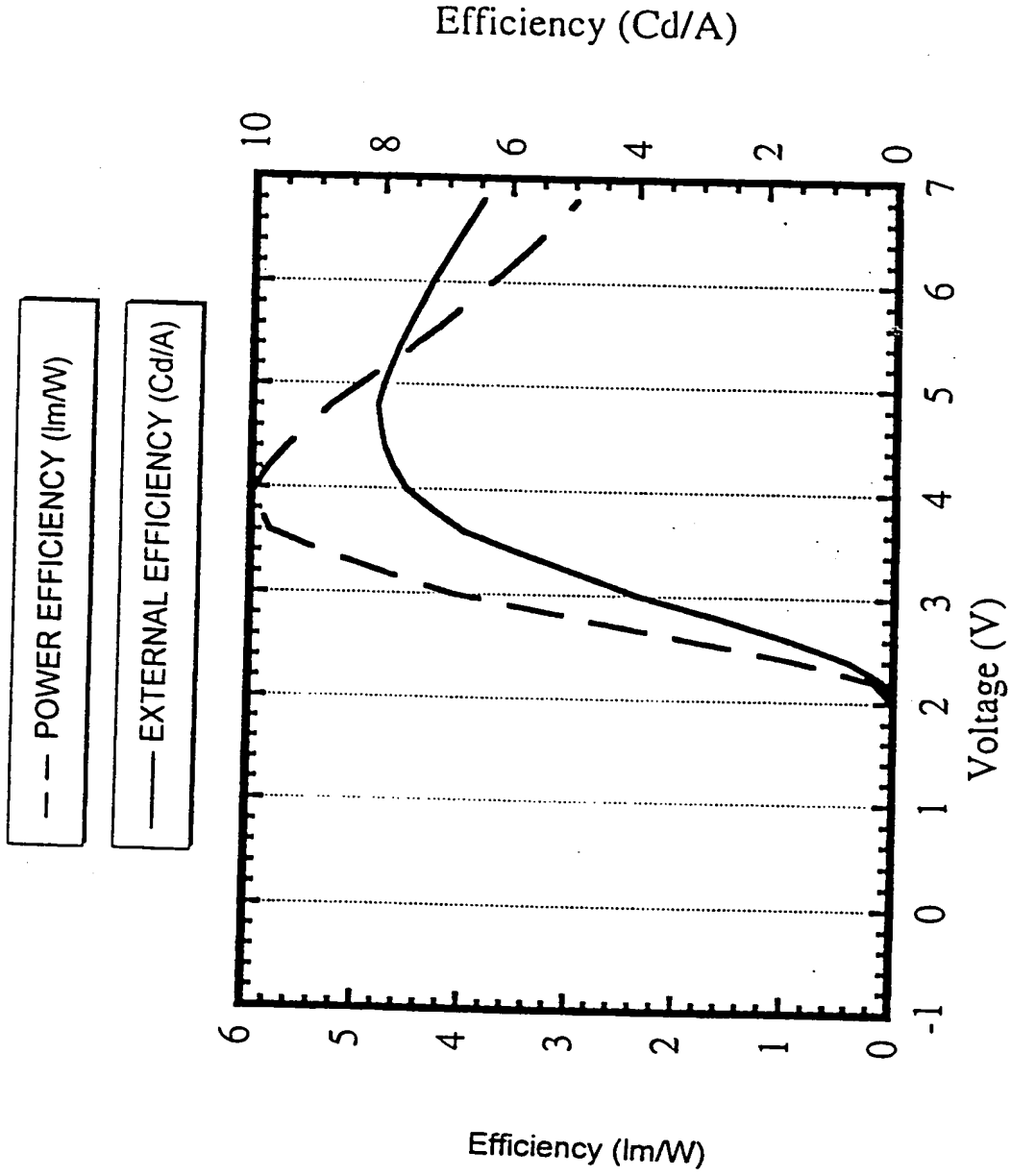

Efficiency (Cd/A)
10
8
6
4
2
0
7
6
5
4
3
2
1
0
-1
Voltage (V)
POWER EFFICIENCY (lm/W)
EXTERNAL EFFICIENCY (Cd/A)
6
5
4
3
2
1
0
Efficiency (lm/W)

FIG. 17

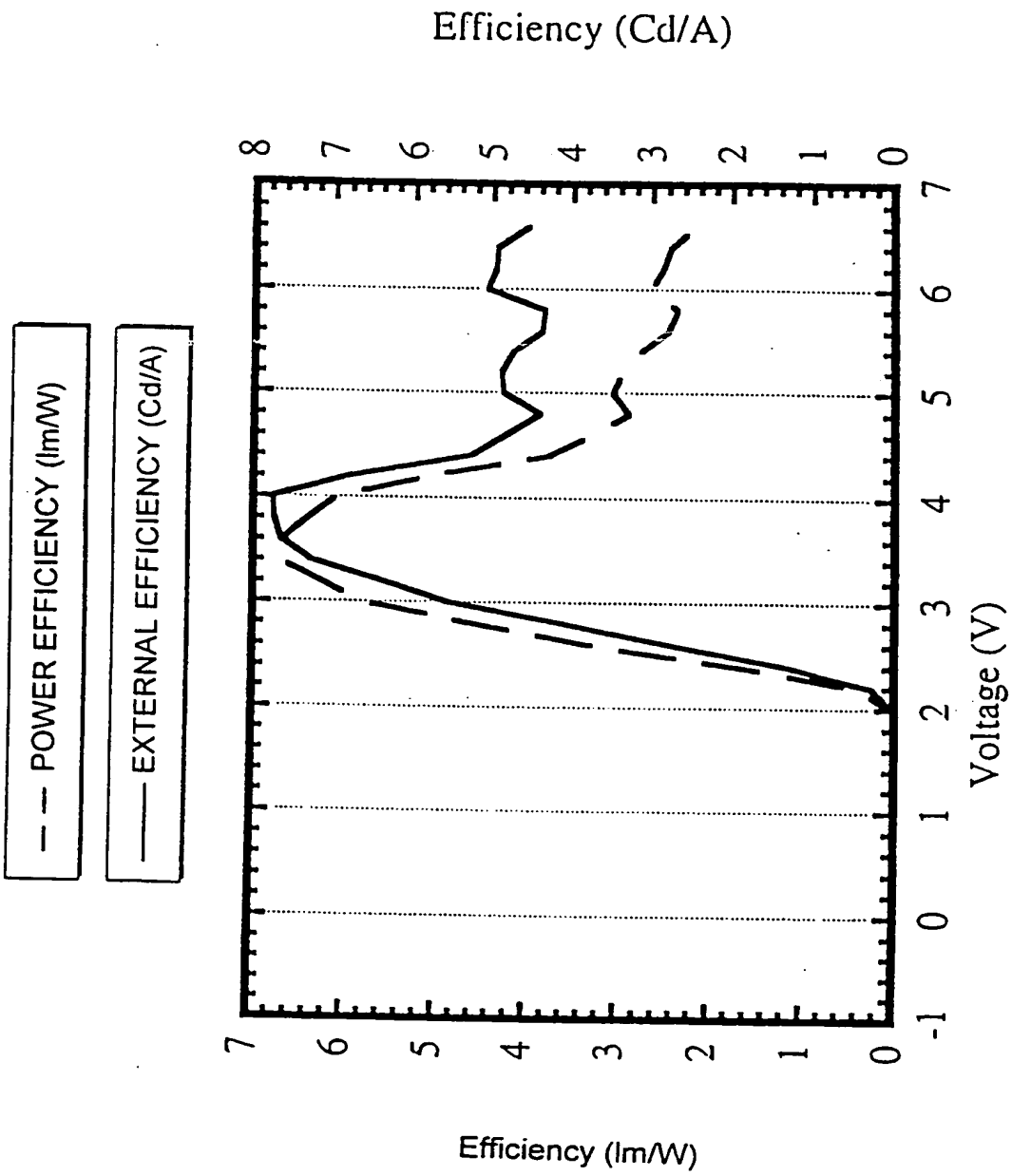

Efficiency (Cd/A)
8 7 6 5 4 3 2 1 0
7
6
5
4
3
2
1
0
-1
Voltage (V)
Efficiency (lm/W)
7 6 5 4 3 2 1 0
POWER EFFICIENCY (lm/W)
EXTERNAL EFFICIENCY (Cd/A)

FIG. 19

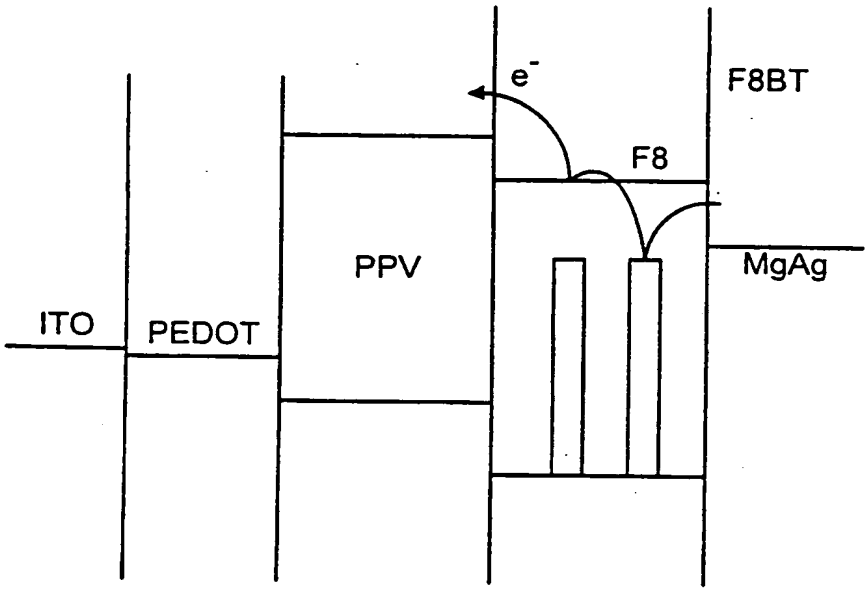
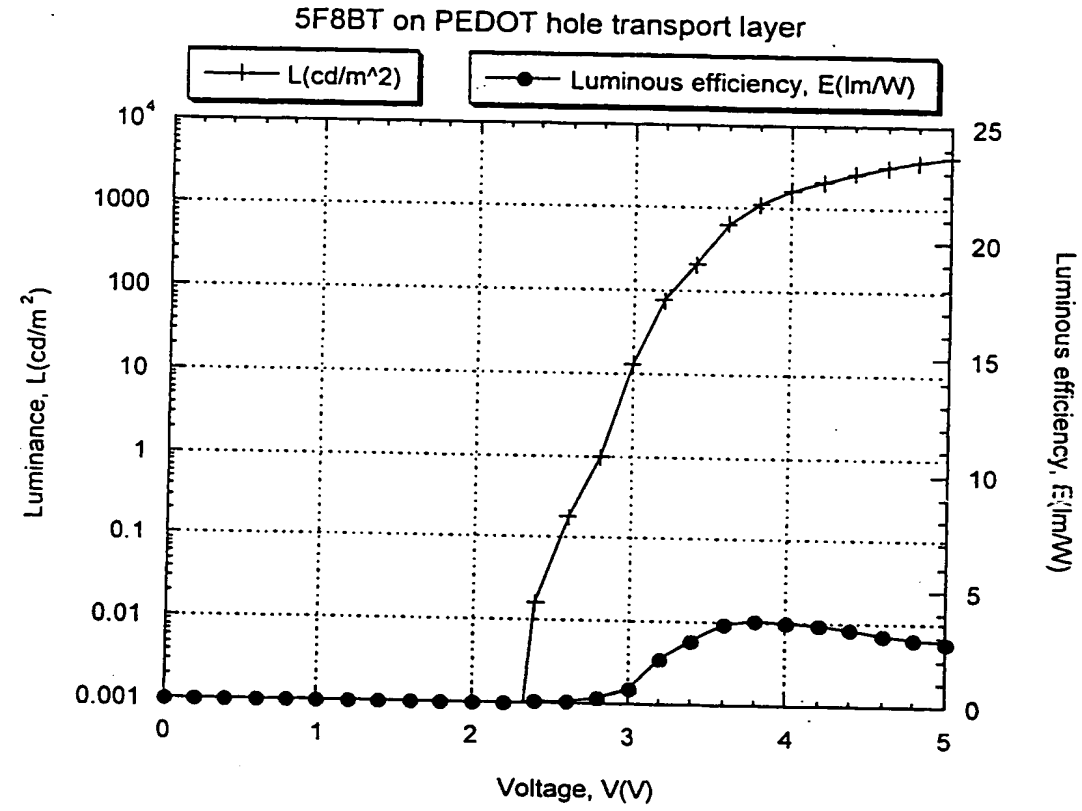


FIG. 20


5F8BT on PEDOT hole transport layer
L(cd/m^2)
Luminous efficiency, E(lm/W)
Luminance, L(cd/m2)
Luminous efficiency, E(lm/W)
Voltage, V(V)

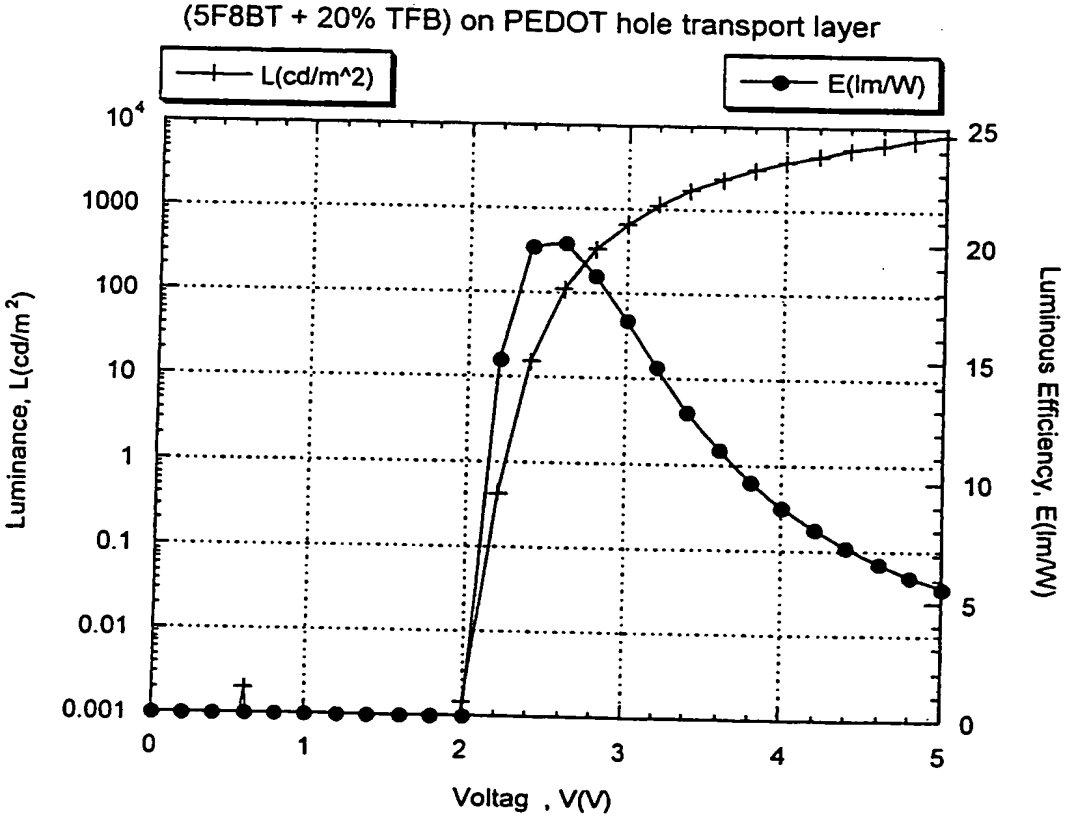

(5F8BT + 20% TFB) on PEDOT hole transport layer
L(cd/m^2)
E(lm/W)
Luminance, L(cd/m2)
Luminous Efficiency, E(lm/W)
Voltag , V(V)

FIG. 22

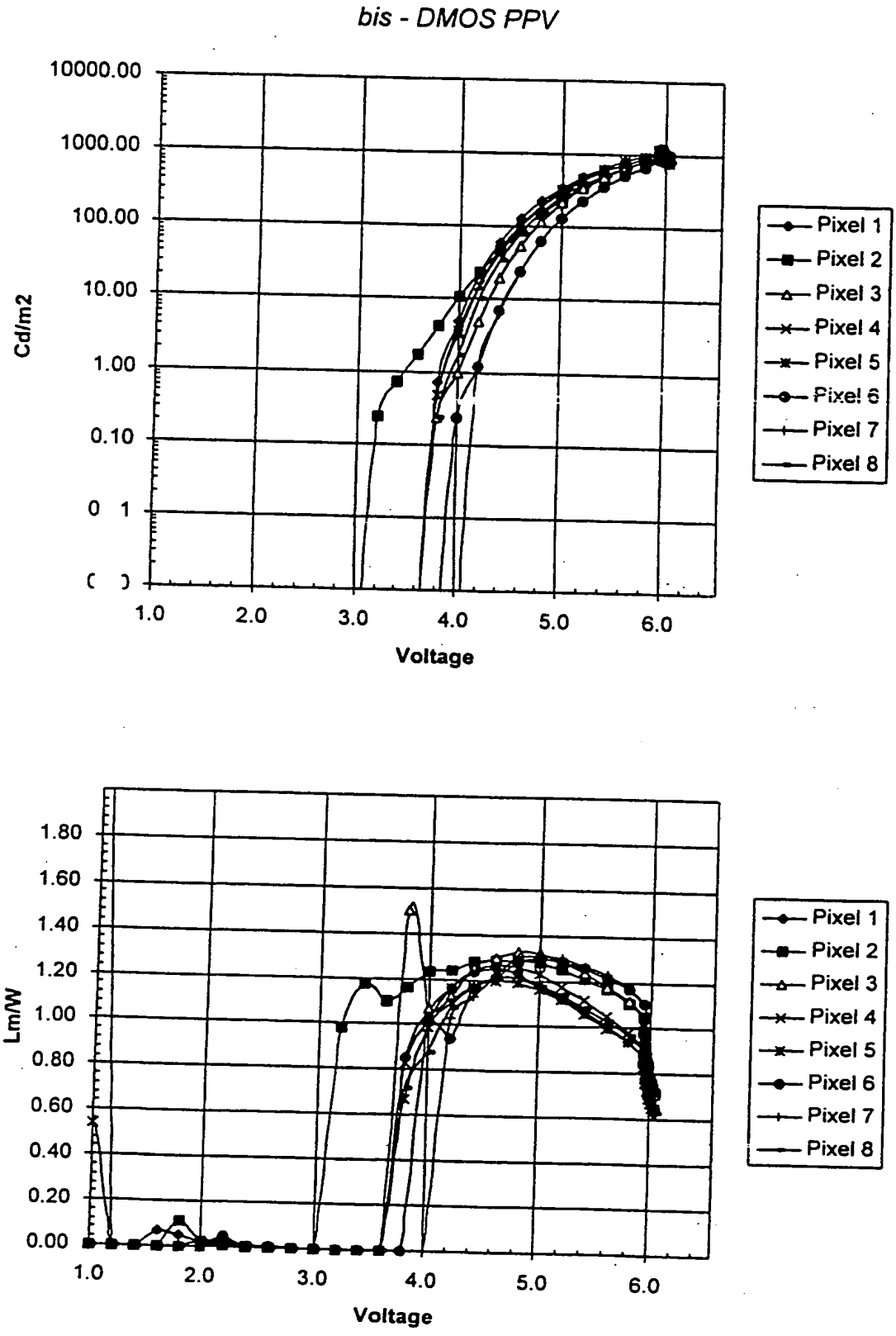
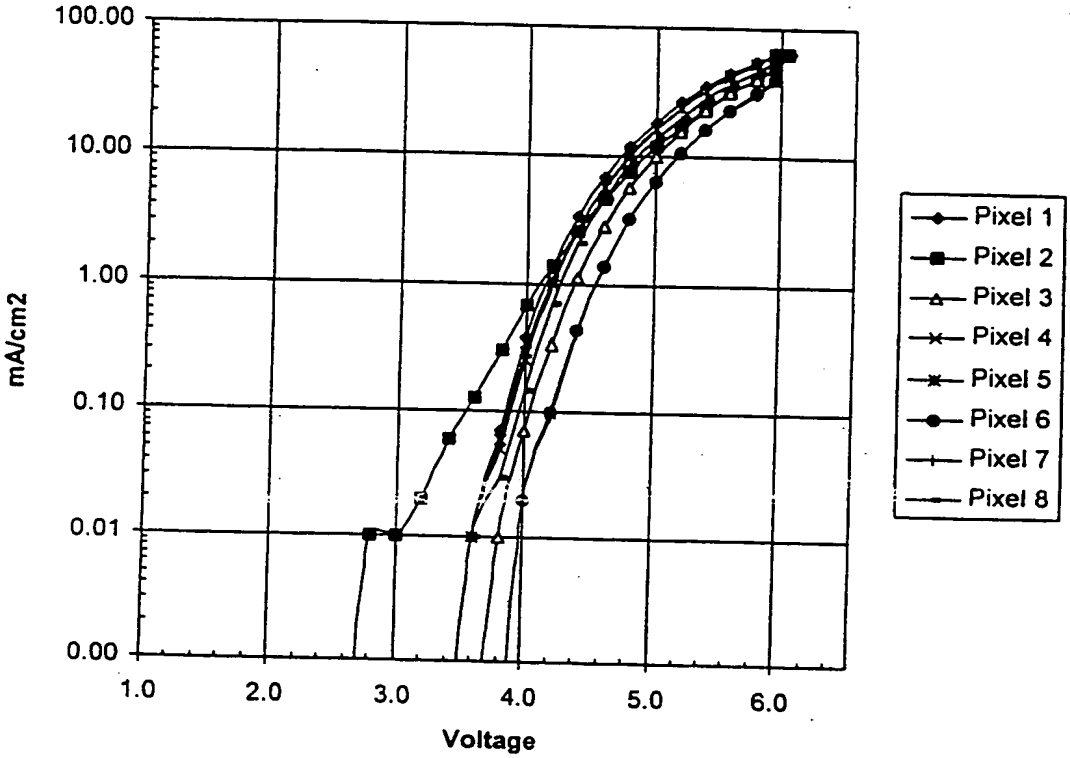

bis - DMOS PPV
10000.00
1000.00
100.00
10.00
1.00
0.10
Cd/m2
1.0
2.0
3.0
4.0
5.0
6.0
Voltage
Pixel 1
Pixel 2
Pixel 3
Pixel 4
Pixel 5
Pixel 6
Pixel 7
Pixel 8
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
Lm/W
1.0
2.0
3.0
4.0
5.0
6.0
Voltage
Pixel 1
Pixel 2
Pixel 3
Pixel 4
Pixel 5
Pixel 6
Pixel 7
Pixel 8

FIG. 23


100.00
10.00
1.00
0.10
0.01
0.00
mA/cm2
1.0
2.0
3.0
4.0
5.0
6.0
Voltage
Pixel 1
Pixel 2
Pixel 3
Pixel 4
Pixel 5
Pixel 6
Pixel 7
Pixel 8

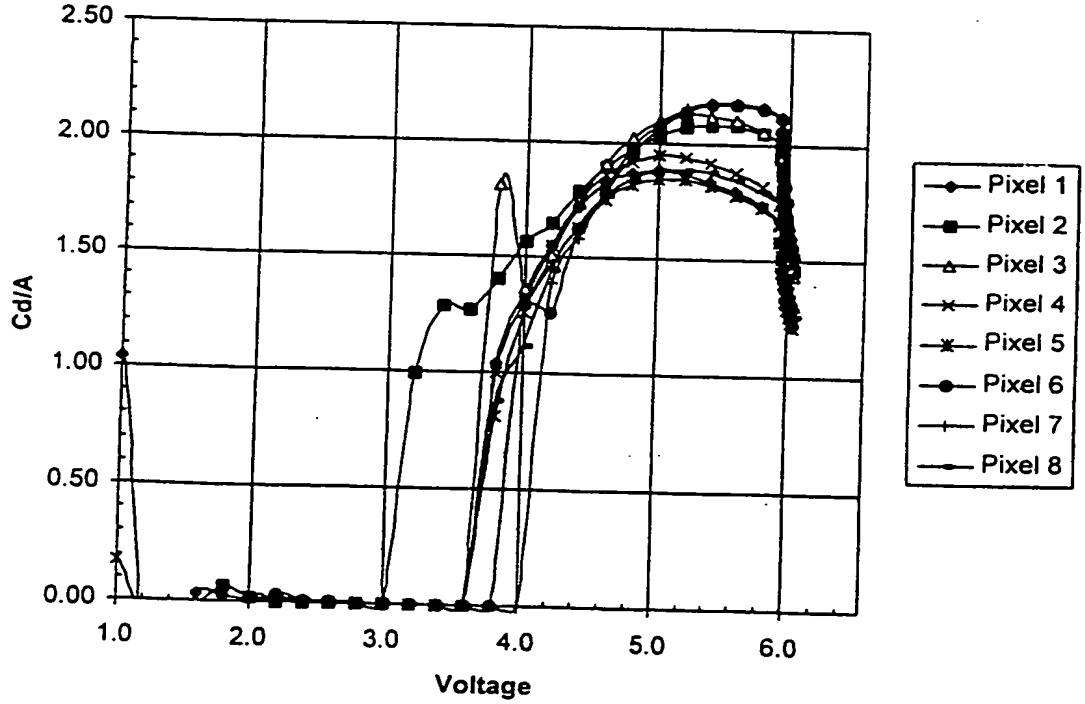

2.50
2.00
1.50
1.00
0.50
0.00
Cd/A
1.0
2.0
3.0
4.0
5.0
6.0
Voltage
Pixel 1
Pixel 2
Pixel 3
Pixel 4
Pixel 5
Pixel 6
Pixel 7
Pixel 8

FIG. 23
CONT'D

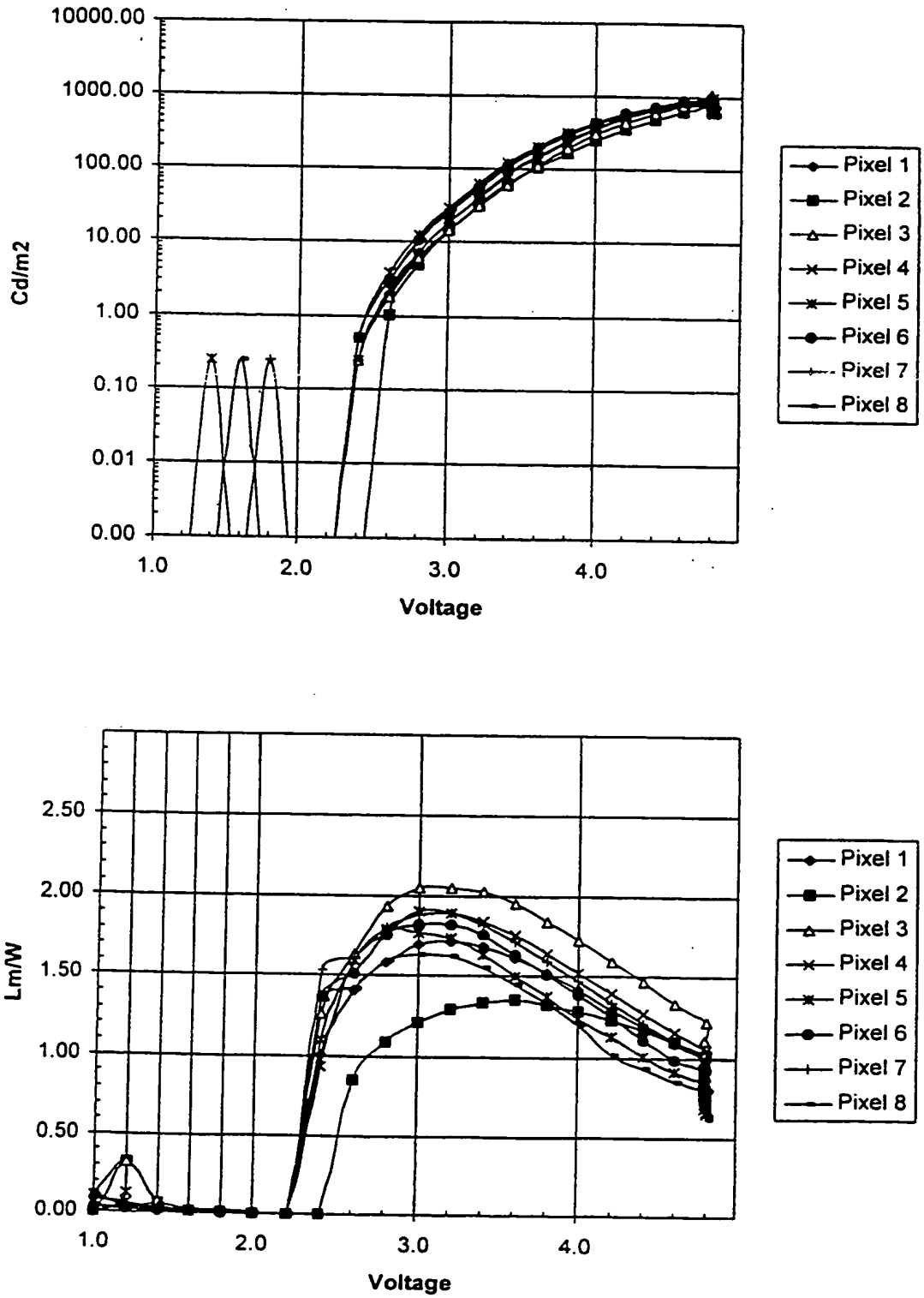
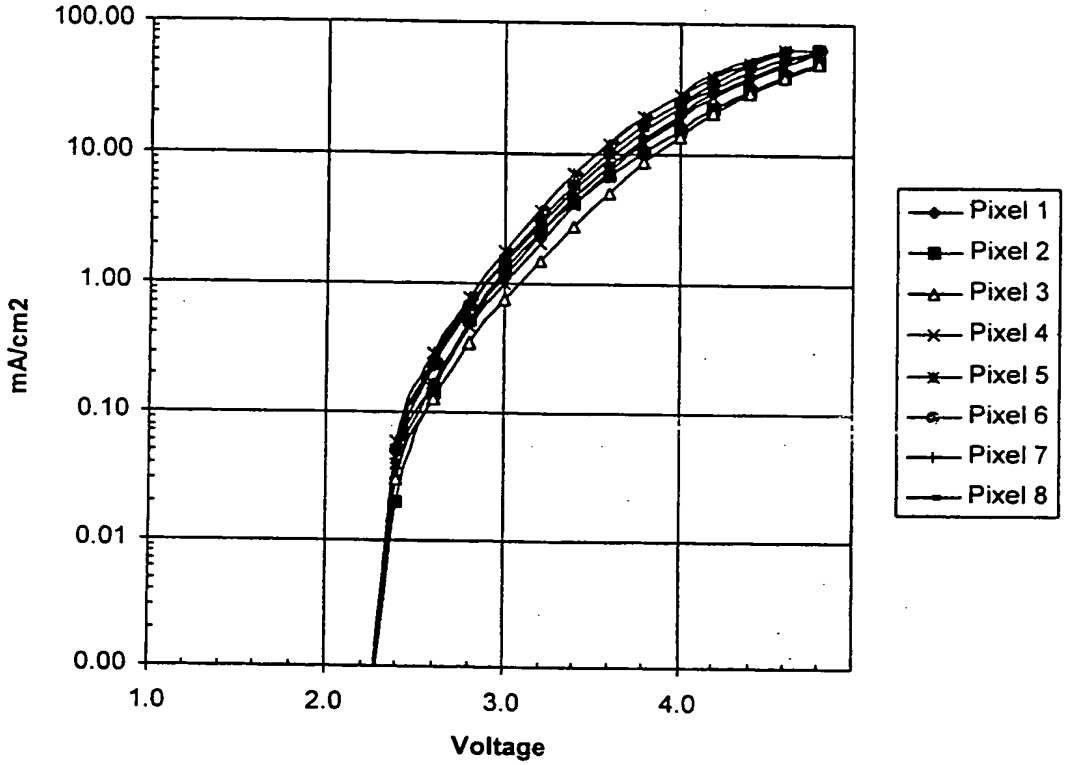

bis-DMOS PPV + 25% TFB
10000.00
1000.00
100.00
10.00
1.00
0.10
0.01
0.00
Cd/m2
1.0
2.0
3.0
4.0
Voltage
Pixel 1
Pixel 2
Pixel 3
Pixel 4
Pixel 5
Pixel 6
Pixel 7
Pixel 8
2.50
2.00
1.50
1.00
0.50
0.00
Lm/W
1.0
2.0
3.0
4.0
Voltage
Pixel 1
Pixel 2
Pixel 3
Pixel 4
Pixel 5
Pixel 6
Pixel 7
Pixel 8

FIG. 24


100.00
10.00
1.00
0.10
0.01
0.00
mA/cm2
1.0
2.0
3.0
4.0
Voltage
Pixel 1
Pixel 2
Pixel 3
Pixel 4
Pixel 5
Pixel 6
Pixel 7
Pixel 8

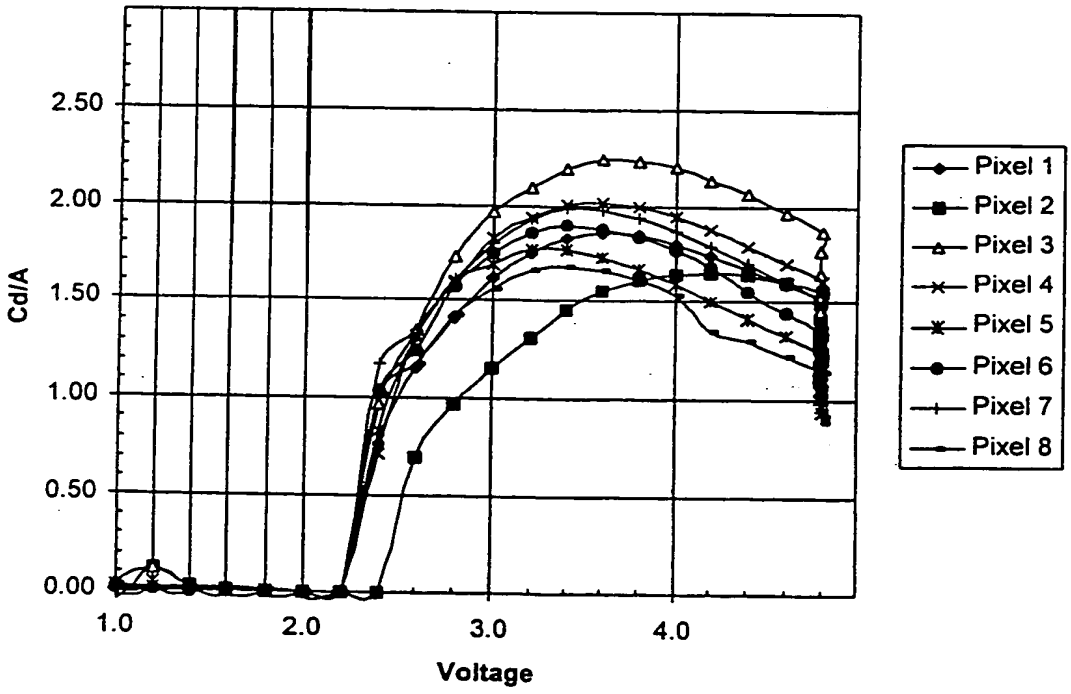
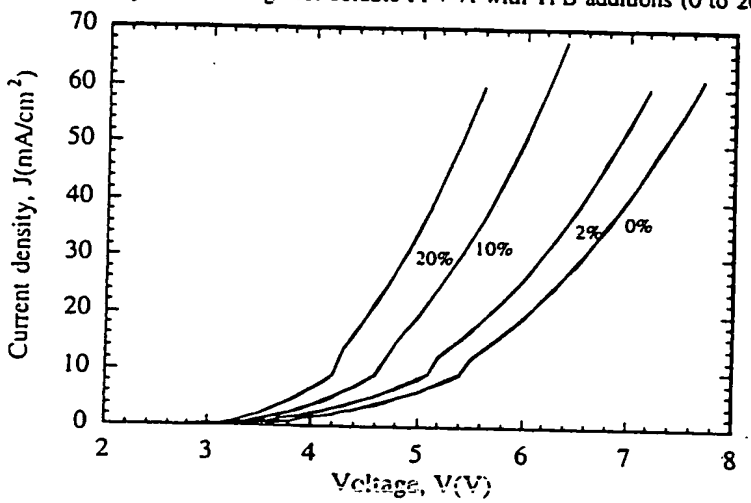
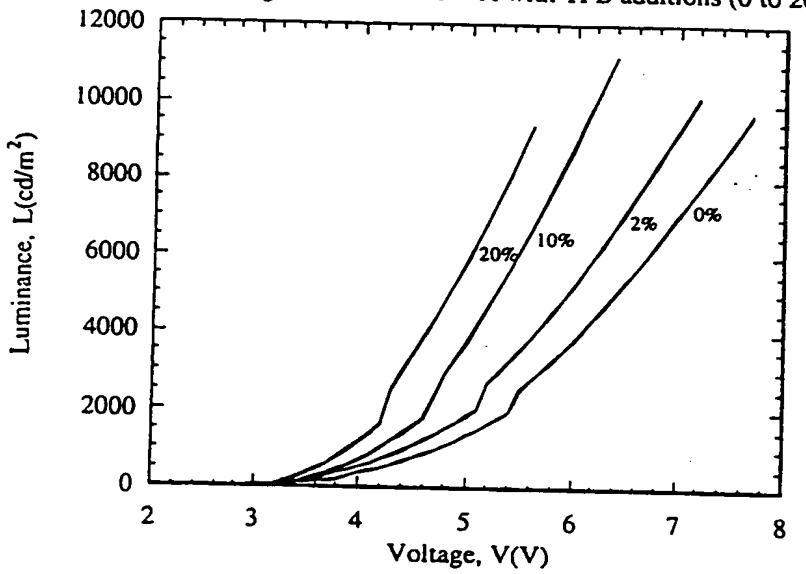

2.50
2.00
1.50
1.00
0.50
0.00
Cd/A
1.0
2.0
3.0
4.0
Voltage
Pixel 1
Pixel 2
Pixel 3
Pixel 4
Pixel 5
Pixel 6
Pixel 7
Pixel 8

FIG. 24
CONT'D

Current density versus voltage for soluble PPV A with TFB additions (0 to 20%)



Luminance versus voltage for soluble PPV A with TFB additions (0 to 20%)



Luminance at fixed voltage for soluble PPV A with TFB additions (0 to 20%)

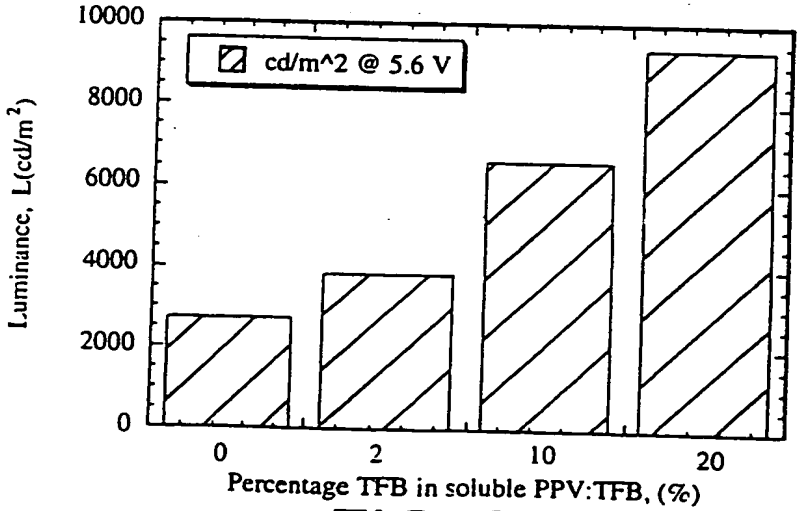
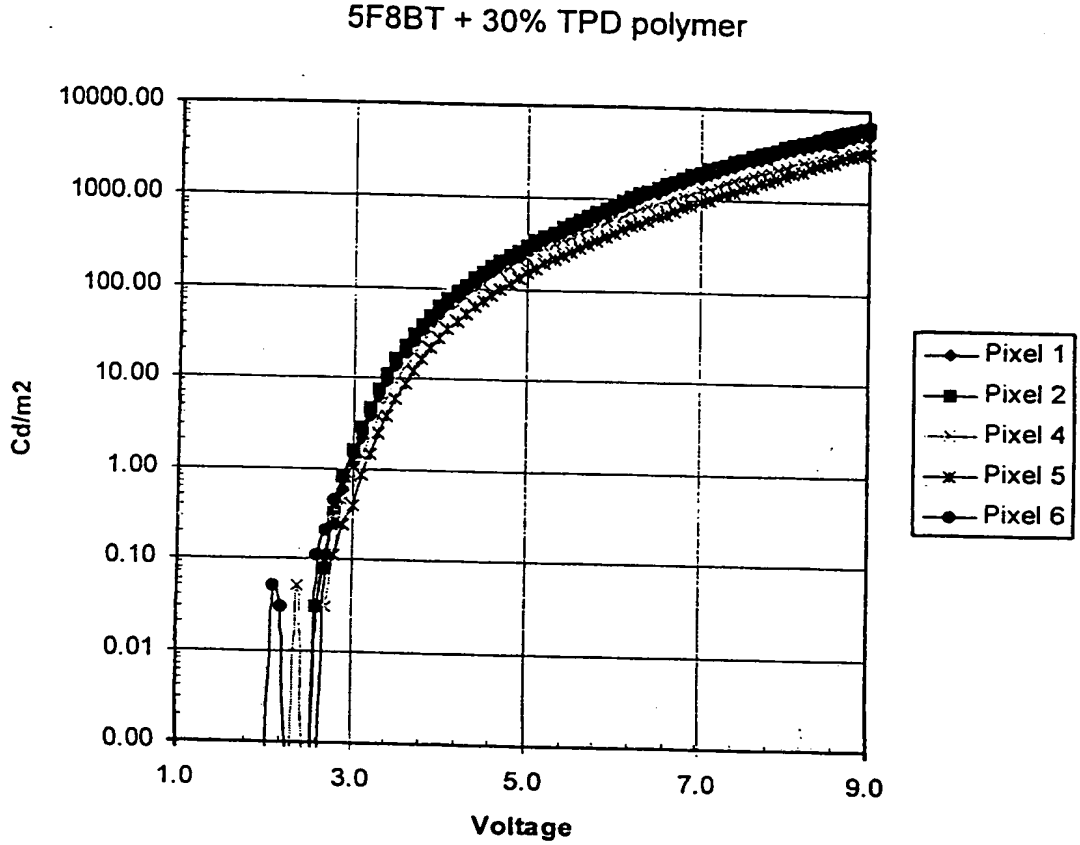


FIG. 25


5F8BT + 30% TPD polymer
10000.00
1000.00
100.00
10.00
1.00
0.10
0.01
0.00
Cd/m2
1.0
3.0
5.0
7.0
9.0
Voltage
Pixel 1
Pixel 2
Pixel 4
Pixel 5
Pixel 6

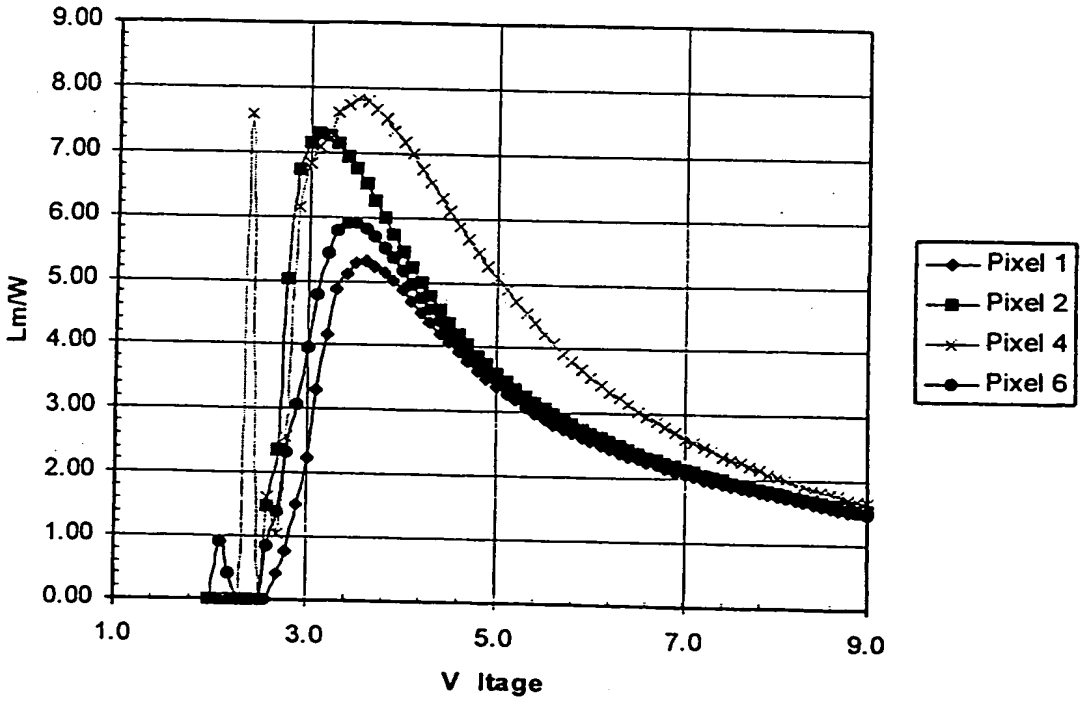
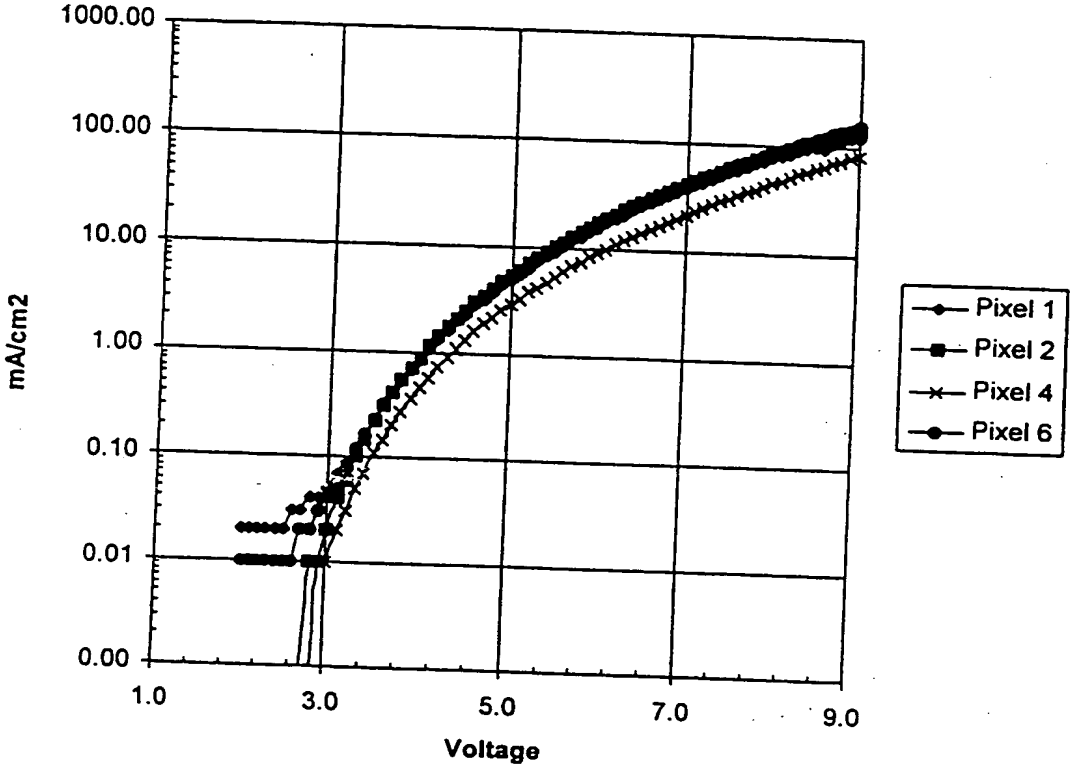

9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
Lm/W
1.0
3.0
5.0
7.0
9.0
V ltage
Pixel 1
Pixel 2
Pixel 4
Pixel 6

FIG. 26


1000.00
100.00
10.00
1.00
0.10
0.01
0.00
mA/cm2
1.0
3.0
5.0
7.0
9.0
Voltage
Pixel 1
Pixel 2
Pixel 4
Pixel 6

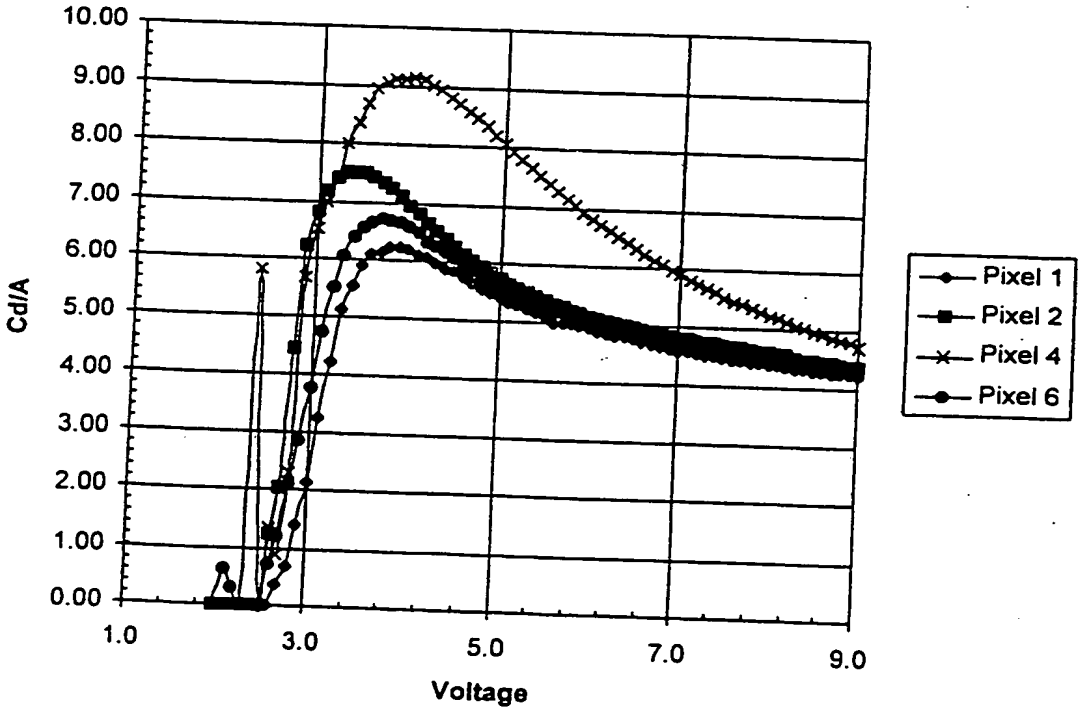

10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
Cd/A
1.0
3.0
5.0
7.0
9.0
Voltage
Pixel 1
Pixel 2
Pixel 4
Pixel 6

FIG. 26
CONT'D

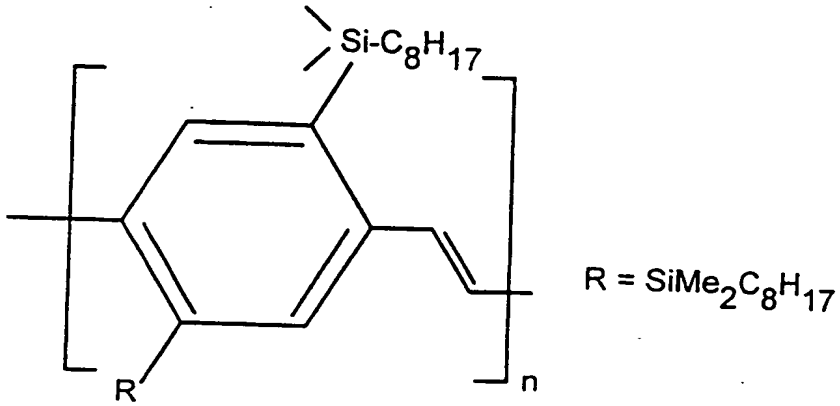

Si-C8H17
R
n
R = SiMe2C8H17

FIG. 27

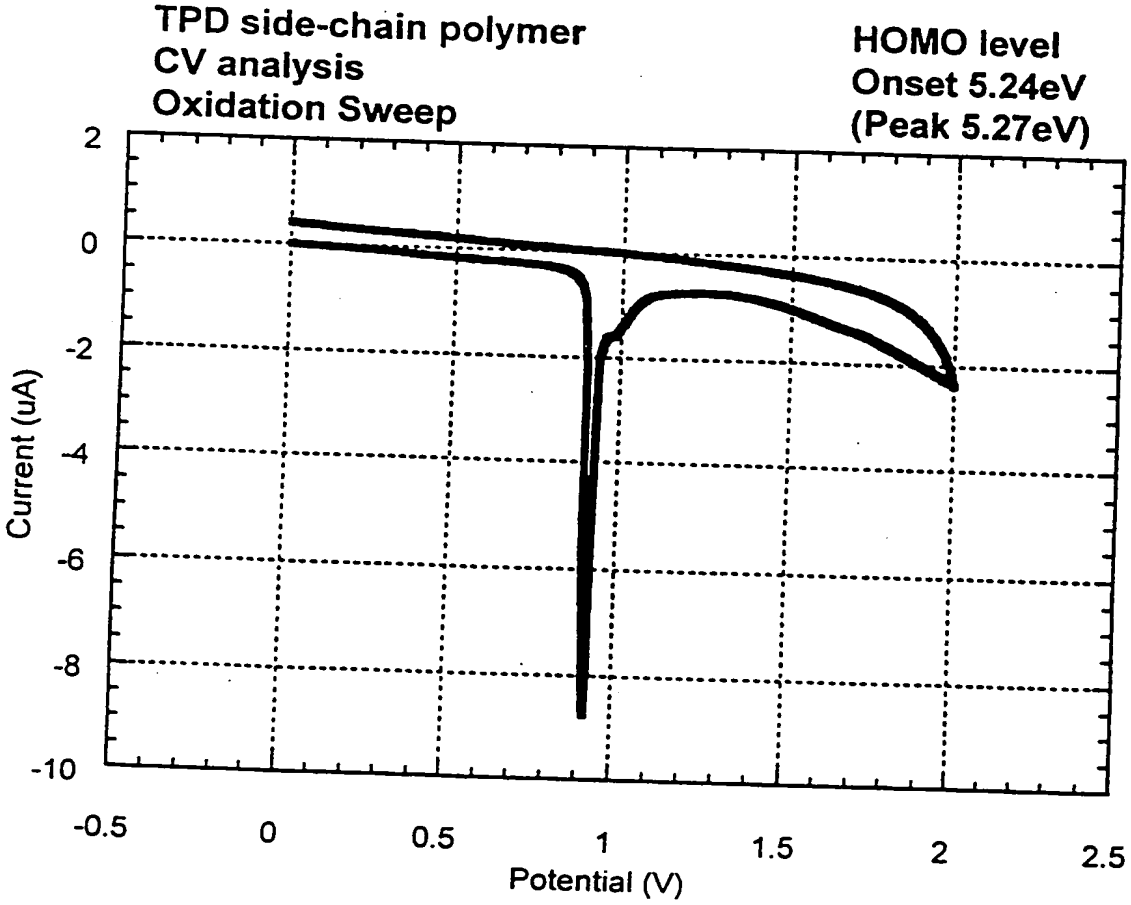

TPD side-chain polymer
CV analysis
Oxidation Sweep
HOMO level
Onset 5.24eV
(Peak 5.27eV)
Current (uA)
Potential (V)
2
0
-2
-4
-6
-8
-10
-0.5
0
0.5
1
1.5
2
2.5

FIG. 29

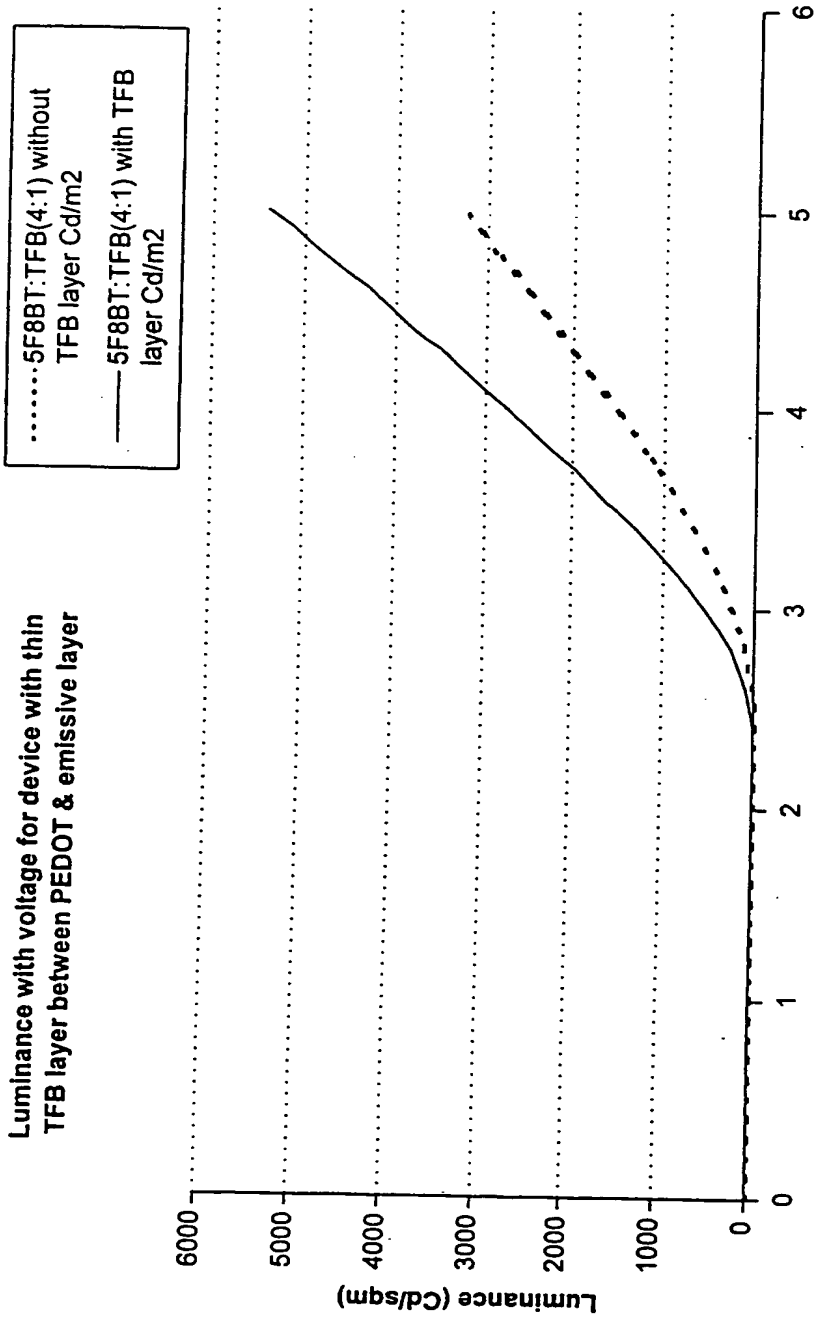

Luminance with voltage for device with thin TFB layer between PEDOT & emissive layer
5F8BT:TFB(4:1) without TFB layer Cd/m2
5F8BT:TFB(4:1) with TFB layer Cd/m2
Luminance (Cd/sqm)
6000
5000
4000
3000
2000
1000
0
Voltage (V)
0
1
2
3
4
5
6

FIG. 28